

Use of Antiepileptic Drugs in the Elderly Population

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THE NEED TO MINIMIZE DRUG USE by the elderly and avoid the risk of toxicity and drug-related costs is a frequent theme in articles about drug use among the elderly (1,2). The antiepileptic drugs are potentially toxic and require therapeutic drug monitoring, adding to the cost of drug therapy (3). Limited information about antiepileptic drug use in extended care facilities indicates that, for more than one-third of patients, there was no documented reason to use these drugs (4,5). In describing inappropriate use of antiepileptic drugs, Moseley and Penry discussed inadequate doses, lack of therapeutic drug monitoring, administration of antiepileptic drugs on an "as needed" basis, and the use of intramuscular phenytoin which is erratically absorbed (4). We reviewed medical records of patients in two extended care facilities to evaluate use of antiepileptic drugs.

Methods

Two extended care facilities for skilled and intermediate care patients (facilities A and B) were selected for review of all medical records of

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Synopsis

Medical records for 572 patients in two extended care facilities were reviewed to study seizure disorders and antiepileptic drug use. Seventy patients (12.2 percent) were receiving antiepileptic drugs. Of this group, 43 patients (61.4 percent) had a diagnosis of epilepsy or documented seizures, 2 were being treated for neuralgia, and 25 (35.7 percent) had no reason given for antiepileptic use. The most common cause was cerebrovascular accident (38.9 percent), and no associated etiology was found in 29.2 percent. Phenytoin was the most commonly used agent. Thirty-two (45.7 percent) were taking two or more antiepileptic drugs. Thirteen patients had had no serum concentration monitoring in the last year. Thirty-seven patients (52.9 percent) had had at least one serum concentration outside of the therapeutic range.

patients present at the facilities on a single day in September 1982. Data collected from a retrospective review of all patients receiving antiepileptic drugs included documentation of a seizure or suspected seizure disorder; documentation of other possible reasons for using the drugs; possible etiologies for seizures; age and sex of the patient; the names, numbers, and doses of antiepileptic agents used; and results of serum concentration monitoring within the past year.

In a second study, medical records of all patients who received antiepileptic drugs in 1982 were reviewed at facility A. Patients who had antiepileptic therapy discontinued were monitored for recurrence of seizures and reinstitution of antiepileptic drugs. Following consultation between the physician responsible for the patients and a clinical pharmacist, antiepileptic agents were discontinued in additional patients, and these patients were monitored prospectively.

Results

A total of 572 patients' records were reviewed,

Table 1. Use of antiepileptic drugs among patients at 2 extended care facilities, 1982

Characteristics of patients	Facility A	Facility B	Total
Total number of patients	215	357	572
Total number on antiepileptic drugs	23	47	70
1 drug	10	28	38
2 drugs	9	18	27
3 drugs	4	1	5
Mean age (years)	64.2	67.8	66.0

Table 2. Etiology of seizures or associated risks for patients receiving antiepileptic drugs

Reason for prescription	Number	Percent
Cerebrovascular accident ¹	28	38.9
Unknown	21	29.2
Alcoholism	7	9.7
Other	7	9.7
Cerebrovascular disease	5	6.9
Head trauma	2	2.8
Meningitis	2	2.8

¹ Diagnoses listed in medical chart.

NOTE: Several patients had more than 1 possible etiology listed.

Table 3. Serum concentration monitoring of patients receiving antiepileptic drugs at 2 extended care facilities, 1982

Drug	Normal range (mcg per ml)	Number of serum concentrations		
		Toxic	Therapeutic	Subtherapeutic
Phenytoin	10-20	31	31	24
Phenobarbital	10-30	2	21	3
Primidone	5-12	0	1	0
Carbamazepine	4-12	0	0	3
Valproic acid	50-150	2	0	0

NOTE: 13 patients were not monitored.

215 from facility A and 357 from facility B. Seventy (12.2 percent) were receiving antiepileptic drugs, of whom 23 (10.7 percent) were from facility A and 47 (13.2 percent) from facility B. Mean age of patients receiving these drugs was 66.0 years.

Of the 70 patients administered antiepileptic drugs, 38 (54.3 percent) were taking one agent, 27 (38.6 percent) two drugs, and five (7.1 percent) were taking three or more drugs simultaneously (table 1). Forty-three patients (61.4 percent) had a diagnosis of epilepsy or seizures documented in their medical charts. Two other patients had a diagnosis of neuralgia as the reason for treatment.

Twenty-five patients (35.7 percent) had no documented seizure occurrence or diagnoses (such as neuralgia) related to use of antiepileptic medication. The etiologies for seizures or associated risks for seizures are described in table 2. The most common cause was cerebrovascular accident (38.9 percent). No associated causes or major risk factors for seizures were found in 21 patients.

The various drugs used follow:

Drug	Number of patients
Phenytoin	63
Phenobarbital	36
Primidone	1
Carbamazepine	4
Valproic acid	3

Although phenytoin was the most commonly used antiepileptic agent, it was the drug with the most dosing problems as reflected by the small number of serum concentrations which fell into the therapeutic range (31 or 36.0 percent of all phenytoin concentrations).

Information about the serum concentration monitoring of patients receiving antiepileptic drugs is reviewed in table 3. Thirteen patients (18.6 percent) received no serum level monitoring at all. A total of 118 drug concentration measurements were made for the remaining 57 patients. Forty-one of the 70 patients (58.6 percent) had at least one serum concentration in the therapeutic range, 20 patients (28.6 percent) had at least one serum concentration in the toxic range, and 17 (24.3 percent) had at least one subtherapeutic serum concentration. Only 53 (44.9 percent) of the measurements were within their recommended therapeutic ranges. Thirty-seven patients (52.9 percent) had at least one serum concentration outside of the therapeutic range.

Details of drug discontinuation are in table 4. Eighteen patients at facility A were tapered off antiepileptic drugs for clinical reasons. A major indication for discontinuing was the absence of seizures during subtherapeutic antiepileptic therapy. Some of the patients with cerebrovascular accidents were started on antiepileptic agents prophylactically since seizures had never been documented. No seizures were noted in the charts during the followup, although one patient was restarted on phenytoin because of the family's request. One of the four patients followed less than 6 months died within a month. Other patients not followed longer than a year entered other facilities or hospitals or returned home.

Discussion

As noted by Moseley and Penry (4), there is a lack of documentation in the medical records of extended care facilities regarding the rationale for use of antiepileptic drugs. In their 1975 study, 17 of 44 patients on antiepileptic drugs (38.6 percent) were found to have no history of epilepsy nor of seizures observed or documented. Our study showed that 25 of 70 records (35.7 percent) had no mention of a seizure disorder. These data, collected 8 years later, are remarkably similar.

This study does not address the possibility that elderly patients who have a seizure disorder were undiagnosed or untreated. Seizures may be misdiagnosed as cardiac syncope, transient ischemic attacks, Meniere's disease, or psychiatric disorders, depending on the clinical presentation. In fact, periodic lateralized epileptiform discharges are associated with prolonged episodes of confusion in elderly patients (6).

Unlike the earlier studies (4,5) the appropriateness of dosing could be evaluated since most patients had therapeutic drug level monitoring. Twenty patients were in the toxic range on at least one occasion (35 toxic serum concentrations during the preceding 12 months), and 17 patients had 30 subtherapeutic levels within the preceding 12 months. While a few patients require serum concentrations either above or below the therapeutic range for optimum seizure control, the majority will be most appropriately treated by "therapeutic" concentrations. Intramuscular phenytoin was used when a patient had a seizure. This is an inappropriate use since intramuscular phenytoin is erratically absorbed; the onset of effect for oral phenytoin would be more rapid (7). "Prn" or "as needed" antiepileptic drug use was not noted.

Since seizure type was often not well-described and EEG information lacking, it was impossible to determine whether the most appropriate drug had been selected for those patients with documented seizures. Phenytoin and phenobarbital were routinely used while the newer agents, carbamazepine and valproic acid, were rarely the drug of first choice. In younger patients, the discontinuation of these sedative-type antiepileptic agents and substitution with carbamazepine and valproic acid has resulted in fewer side effects for many patients (8).

The most common etiology of seizures was cerebrovascular accident (38.9 percent), and these patients formed 70.6 percent of the group successfully discontinued from antiepileptic drugs. Eleven of 44 patients (25.0 percent) in Moseley and

Table 4. Followup of 18 patients after discontinuation of antiepileptic drugs

Item	Number of patients
History and outcome:	
Diagnosis of cerebrovascular accident.....	12
Seizures documented in medical chart.....	8
No seizures documented in medical chart.....	10
Prescribed phenytoin.....	17
Successfully discontinued.....	18
Serum concentrations of drugs:	
Subtherapeutic.....	15
Therapeutic.....	0
Toxic.....	1
None.....	2
Followup period:	
6 months.....	4
6-12 months.....	4
12 months.....	9

Penry's population (4) had cerebrovascular accidents. The literature is unclear about the indications for and recommended length of antiepileptic prophylaxis following cerebrovascular accidents. However, these data indicate a need for reevaluation of chronic antiepileptic drug use in this population. Discontinuation of unnecessary antiepileptic drugs may be particularly helpful in reducing unnecessary medication with its attendant costs and drug toxicity in institutionalized patients.

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